

AMENDMENTS TO THE CLAIMS

1. **(CURRENTLY AMENDED)** A method of determining the condition of a device, process, material or structure including the steps of:
 - a.** measuring ~~acoustic emissions from the device or process~~, acoustic emission events from the device, process, material or structure;
 - b.** determining inter-arrival times of the acoustic emission events;
 - c.** determining a statistical distribution of the inter-arrival times ~~and therefrom~~ ;
 - d.** determining from the statistical distribution statistical parameters ~~characterising which characterize~~ the distribution; ; and
 - e.** using the statistical parameters as an indication of the condition of the ~~device or process~~ device, process, material or structure being monitored.
2. **(ORIGINAL)** A method according to claim 1, wherein the statistical parameters are obtained using parameter estimation.
3. **(CURRENTLY AMENDED)** A method according to claim 1 ~~or 2~~, wherein a Weibull distribution is used.
4. **(CURRENTLY AMENDED)** A method according to claim 1 ~~, 2 or 3~~, including the step of determining a distribution of a shape to characteristic life ~~distribution parameter~~ for at least one component of the ~~device or process~~ device, process, material or structure.
5. **(ORIGINAL)** A method according to claim 4, wherein the shape to characteristic life parameter is a unit based on inter-arrival times of successive acoustic emission events and is a function of the ratio of the shape factor of the inter-arrival time distribution to the characteristic and guaranteed life in a statistical distribution used to describe the probability of time to failure.

6. **(CURRENTLY AMENDED)** A method according to ~~any preceding claim~~ claim 1, including the step of monitoring trends in changes in the determined statistical parameters over time.

7. **(CURRENTLY AMENDED)** Apparatus for determining the condition of a device, process, material or structure, including:
 - a. at least one sensor operable to measure ~~acoustic emissions from a device or process~~ acoustic emission events from the device, process, material or structure to be monitored;
 - b. processing means ~~operable to determine inter-arrival times of acoustic emission events, to determine for:~~
 - (1) determining a statistical distribution of the inter-arrival times of the acoustic emission events;
 - (2) determining from the statistical distribution and therefrom statistical parameters characterising the distribution; and ~~to use~~
 - (3) using the statistical parameters as an indication of the condition of the ~~device or process~~ device, process, material or structure being monitored; and
 - c. output means to output the results of the ~~determination~~ indication to a user.

8. **(ORIGINAL)** Apparatus according to claim 7, wherein the processing means is operable to obtain the statistical parameters using parameter estimation.

9. **(CURRENTLY AMENDED)** Apparatus according to claim 7 ~~or 8~~, wherein the processing means is operable to use a Weibull distribution.

10. **(CURRENTLY AMENDED)** Apparatus according to claim 7, ~~8 or 9~~, wherein the processing means is operable to determine a shape to characteristic life distribution for at least one component of the ~~device or process~~ device, process, material or structure.

11. **(ORIGINAL)** Apparatus according to claim 10, wherein the shape to characteristic life parameter is a unit based on inter-arrival times of successive acoustic emission events and is a function of the ratio of the shape factor of the inter-arrival time distribution to the characteristic and guaranteed life in a statistical distribution used to describe the probability of time to failure.
12. **(CURRENTLY AMENDED)** Apparatus according to ~~any one of claims 7 to 11~~ claim 7, wherein the processing means is operable to monitor trends in changes in the determined statistical parameters over time.
13. **(CURRENTLY AMENDED)** Apparatus according to ~~any one of claims 7 to 12~~ claim 7, wherein the output means includes at least one of:
- a. a graphical display,
 - b. an optical display, and/or
 - c. an acoustic signal.
14. **(CURRENTLY AMENDED)** Apparatus according to claim 13, wherein the output means provides an alarm signal ~~operable to activate an alarm, including to~~ to at least one of:
- a. an acoustic alert device,
 - b. a telephone, and
 - c. to an electronic mail address.

15. **(NEW)** A method of determining the condition of a device, material or structure including the steps of:
- a. measuring acoustic emission events from the device, material, or structure;
 - b. determining the inter-arrival times between successive acoustic emission events;
 - c. statistically characterizing the distribution of the inter-arrival times;
 - d. monitoring the statistical characteristics of the inter-arrival times; and
 - e. generating an alert to a user when the statistical characteristics reach a failure threshold.
16. **(NEW)** The method of claim 15 wherein the inter-arrival times are statistically characterized as meeting a Weibull distribution.